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Peer Review Practices in Biomedical Literature: A Time for Change?

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OBJECTIVE: The purpose of this study was to collect the opinions of a cross section of published authors on current practices concerning peer review in biomedical publishing.
METHODS: A questionnaire on various aspects of peer review was emailed to authors, whose manuscripts were published in *Gut* or the *British Journal of Surgery* between 2001 and 2006. Authors were asked to base their responses on their overall experience with peer review in biomedical literature and not with that one particular journal.
RESULTS: Most respondents felt that peer review is an effective quality control mechanism and does help improve manuscripts. Although some felt that it may cause delays in publication, lead to some research being lost and may not prevent all research-related fraud, most authors felt that there was still a strong role for the peer review process as it exists today.
CONCLUSION: An overwhelming majority of authors in our study approved of the current peer review practices in biomedical literature. A minority did however seem concerned. We discuss here the surrounding issues. [*Asian J Surg* 2009;32(4):240–6]

Key Words: biomedical publishing, peer review

Introduction

Peer review (PR) is the process of subjecting an author's scholarly work, research, or ideas to the scrutiny of others who are experts in the same field.[1] It is considered a quality control and validation exercise and publications that have not undergone PR are viewed with scepticism by scholars and professionals.[1–3] It can also improve the quality of work, guard against plagiarism, and even detect fabrication of evidence or research fraud. Such benefits are however increasingly being questioned, and a recent Cochrane review concluded that there was little empirical evidence to support the use of editorial PR as a mechanism to ensure the quality of biomedical research.[4] Moreover, PR brings in the problems of publication delays, increased expenditure and various biases.[5] The role of PR as an exercise that is necessary to maintain the standards of published scientific research is coming under increasing scrutiny as was evident during a recent debate on the *Nature* website.[6] The methods of PR followed by individual journals can be vastly different. It can be completely open (where both authors and reviewers know each other's identity), single blinded (SBPR; in which reviewers know the identity of the author(s) but not vice versa), and double blinded PR (DBPR; where neither of them is aware of the other's identity). By and large,

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SBPR is the practice most commonly followed by biomedical journals.[5,7] SBPR is vulnerable to bias against new ideas, women, young scientists, scientists from developing countries and those from less prestigious institutions.[5,8] These issues have prompted journals like *Nature* and *Biology Direct* published by BioMed Central to experiment with newer methods of PR. The purpose of this survey was to find out the opinions of a cross section of published authors on various aspects of current PR practices.

Methods

A questionnaire (Appendix 1) covering various aspects of PR was emailed to authors, whose manuscripts were published in *Gut* or the *British Journal of Surgery* during the 6-year time period from January 2001 to December 2006. Authors were asked to base their responses on their overall experience with PR in biomedical literature and not with that one particular journal. These two journals were arbitrarily selected as the journals with wide readership and considerable reputation in their respective specialties, thus increasing the likelihood that our study population would have come across the PR practices of a number of biomedical journals. Email addresses for corresponding authors were obtained from the print versions of the articles and a total of 2,818 emails were sent out. Out of these, 749 (26.5%) emails could not be delivered, presumably because the email accounts were no longer in operation; the remaining 2,069 (73.5%) were successfully delivered.

Results

A total of 298 (14.4%) responses were obtained. Some authors did not answer all the questions, accounting for minor differences in the total number of responses obtained for individual questions. Figures 1–11 show the responses to the individual questions. The numbers shown in the figures are the actual number of responses to each question.

Discussion

We present here the cumulative opinion of 298 authors on various aspects of PR practised by biomedical journals. The data contained in this study will help us understand PR better and suggest areas for improvement. PR is considered essential for scientific publications.[9,10] However, doubts have been raised about its efficacy as a quality control mechanism. It often fails to detect duplicate publication, conflicts of interest, statistical flaws,[11] and fabrication of data.[12,13] PR may delay the publication of research.

In this study, only 30 (10%) authors felt that PR never delays publication of research (Figure 5); the remainder felt that there was a degree of delay at least sometimes. Such delays not only slow the pace of scientific research but also run the risk that data may become irrelevant by the time it is published. It may also have career implications for scientists. Very often, manuscripts are turned down by journals with higher impact factors before being finally accepted by a journal with a lower impact factor, leading to further delays in publication. This gives an impression that PR can pass arbitrary judgement on manuscripts, and the vigour with which a manuscript is checked is often determined by the stature of the journal. A manuscript that is not acceptable to a set of reviewers but considered to be suitable by another set leads to questions on the validity of the entire exercise.

Moreover, some research is lost in this process and never published. In our study, only 62 (21%) authors felt that research was never lost as a result of PR (Figure 10).

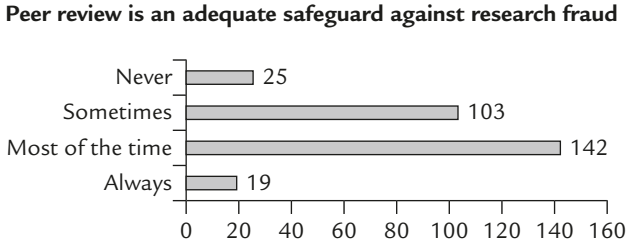

Figure 1. Only 19/289 (6.5%) respondents felt that PR "always" works as an adequate safeguard against research fraud. More authors (25/289 or 8.6%) felt that it "never" worked against research fraud. A further 142/289 (49.1%) and 103/289 (35.6%) felt that it worked "most of the time" and "sometimes" respectively.

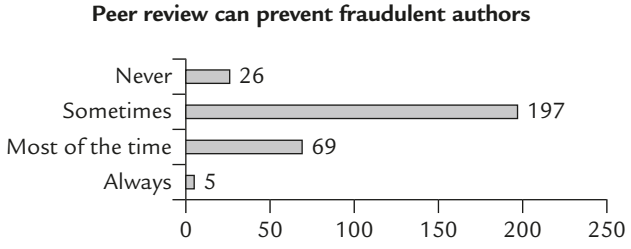

Figure 2. Only 5/297 (1.7%) respondents felt that PR can prevent fraudulent authors; 26/297 (8.7%) felt that it can never prevent fraudulent authors; 69 (23.2%) and 197 (66.3%) respectively felt that it can prevent them "most of the time" and "sometimes".

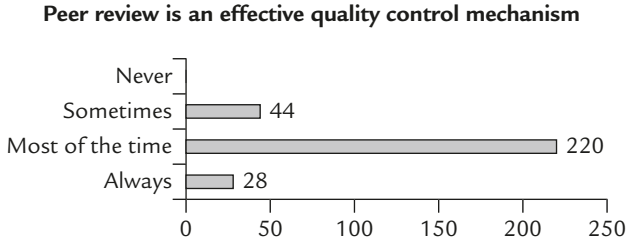

Figure 3. The majority of our respondents believed that PR works "always" (28/292, or 9.6%) or "most of the time" (220/292 or 75.3%) as an effective quality control mechanism.

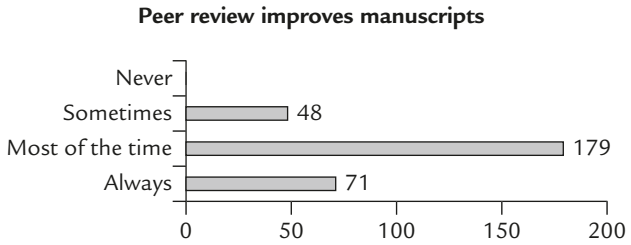

Figure 4. A large number of our respondents felt that PR "always" improves manuscripts (71/298 or 24%) or "most of the time" (179/298 or 60%). Nobody said it never improved manuscripts.

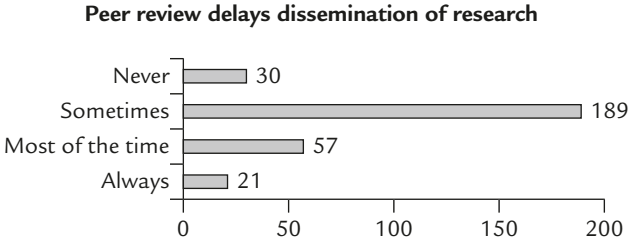

Figure 5. The majority of respondents felt that PR delayed dissemination of research "most of the time" (57/297 or 19.2%) or "sometimes" (189/297 or 63.6%).

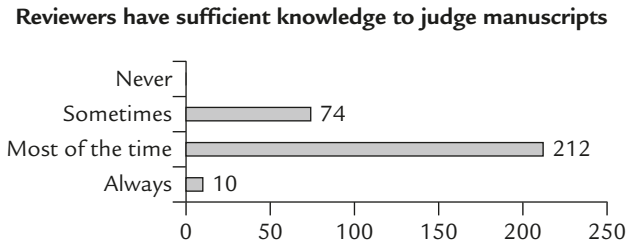

Figure 6. Ten of 296 (3.3%) and 212/296 (71.6%) reviewers respectively felt that reviewers have sufficient knowledge "always" and "most of the time". A significant minority (74/296 or 25%) felt that reviewers had sufficient knowledge only "sometimes".

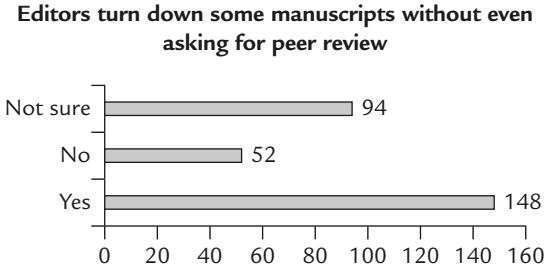

Figure 7. Half (148/294) of our respondents believed that editors turned down some manuscripts without even asking for peer review.

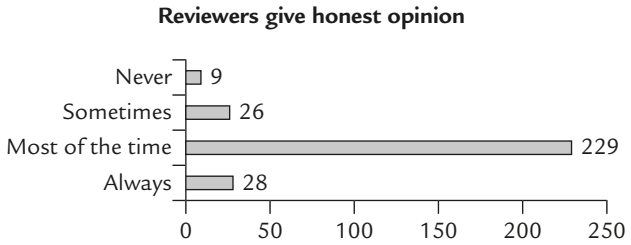

Figure 8. An overwhelming 229/292 (78.4%) authors felt that reviewers give an honest opinion.

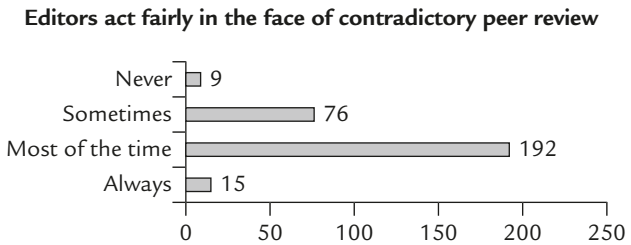

Figure 9. The majority of our respondents felt that editors act fairly "always" (15/292 or 5.1%) or "most of the time" (192/292 or 65.75%) in the face of contradictory PR.

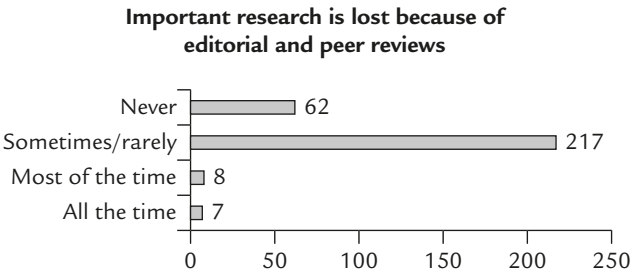

Figure 10. The majority (217/294 or 73.8%) of our respondents believed that it is only "sometimes/rarely" that important research is lost because of editorial or peer reviews.

A total of 148 (50%) authors in this study felt that editors turned down some manuscripts without even asking for any formal PR and a further 94 (32%) were not sure (Figure 7). Journals on the other hand argue that editorial screening improves the overall efficiency.[14] There is however a theoretical possibility that some editors may feel under pressure to cater to popular reader demands to keep the journal financially viable, which would clearly be

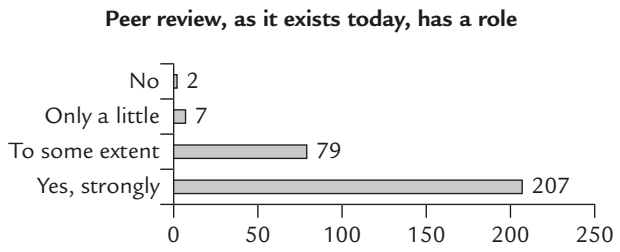

Figure 11. Overall, 207/295 (70%) of our respondents felt that there was a "strong" role for PR as it exists today. A further 79/295 (26.8%) felt that it had "some role".

in their own personal interest too. Moreover, editors may feel inclined to accommodate high profile science and worse, may have the journal's or their own agenda to promote. In our study, only 15 (out of 292 responses) authors felt that editors always acted fairly in the face of contradictory PR, while an overwhelming majority (192 out of 292) thought they did so most of the time (Figure 9). Authors from developing countries routinely claim to be discriminated against by journals and editors. We have previously shown that journals have a tendency to publish more manuscripts from their country of origin.[15] Despite all these obvious concerns, it is widely appreciated that most editors play the extremely difficult role of being the scientific gatekeepers very efficiently and without them, it would be difficult to control the flow and direction of scientific publishing.

Coming to the role of reviewers (Figures 6 and 8), only 10 out of 296 (3.5%) felt that reviewers always had sufficient knowledge to judge a manuscript and only 28 out of 292 (9.6%) felt that reviewers were always honest. It should indeed be very worrying if even a very small proportion of academicians feel that reviewers do not always act honestly. A recent report by the Publishing Research Consortium[16] revealed that reviewers spent an average of 8.6 hours on a manuscript. Authors usually spend months preparing a manuscript. What then is the guarantee that reviewers would be able to add significantly to a manuscript in a few hours? Reviewers may not be completely impartial and reviews may reflect personal opinion. Reviewers may not always have sufficient knowledge to comment on a manuscript or have the desired statistical knowledge to be able to make a fair assessment. There is a further potential for plagiarism. Finally, there is the often-encountered problem of disagreement amongst the reviewers as to the merit of a manuscript. There is no quality control mechanism to assess the quality of reviews. Some reviewers may not find enough motivation in the entire exercise to provide high quality reviews. Should reviewers be financially compensated or acknowledged scientifically? Should reviewers be made to compete against one another for the prestige associated with reviewing a work of science? Some feel that there is a need to offer more rewards for reviewers.[17]

Various methods of PR have been tried in an attempt to solve some of these issues. Completely open reviews, where both authors and reviewers know each others' identity, may make reviewers more accountable. It has indeed been shown that reviewers who are asked to sign their reports are more cautious, take more time and are more likely to recommend the acceptance of a manuscript.[18] Reviewers are, however, more likely to decline if they are asked to sign their reports.[19] Moreover, open review does not eliminate the bias resulting from the background of authors. Proponents of DBPR believe that it allows reviewers to give an honest opinion.[2] Opponents argue that even with DBPR, it is possible to identify authors in a large number of cases. An alternative suggestion is to blind reviewers to authors but keeping authors aware, i.e. exactly opposite of currently followed SBPR. We could refer to it as reviewer blinded PR. This approach would solve the problem of bias arising from the background of authors and allow reviewers to be completely objective in their assessment. At the same time, not knowing the author's identity would help reviewers and allow them to be completely honest in their reviews. Revealing the reviewer's identity to the authors would presumably lead to an improvement in the quality of reviews.

Financial burden is an additional consideration and as long as PR is considered necessary, somebody will have to bear its cost. It could be readers who have to bear this as has traditionally been the case or, more recently, authors with some open access journals. Both approaches have their own advantages but both disadvantage the developing world. Moreover, the price of the articles and journals do not just reflect the actual costs incurred. Most big publishing houses are businesses where the interests of shareholders will take priority over easy, cheap, and equitable access to science. There are indeed voices claiming that widespread adoption of open access would lead to a reduction in the number of financially sustainable peer reviewed journals and hence the overall quality of articles.[20]

Post publication PR

The Internet has made it possible for authors, editors and publishers to experiment with publishing models that deviate from those used in the past. It may be argued that prepublication PR is not needed at all. We could allow all manuscripts to be evaluated in the market place, something physicists do routinely, and let manuscripts find their own value. Some of these problems can be overcome by post publication PR where every single manuscript is published and then thrown open to the wider review by the scientific community. Every reader would be able to grade and comment on a manuscript. Commentators would have to disclose their own positions, research interests, publications and academic background openly so that readers may judge the comment fairly. Authors would not only be able to respond to queries by posting their own comments but would also be able to submit revised versions of their manuscripts. The possibility of post publication amendments of articles would ensure that articles are never out of date and may have huge potential for improving the quality of scientific publications. Though this approach may solve many of the problems encountered with traditional PR, there is the potential risk that we may all be inundated with irrelevant, unscientific rubbish. The proponents of post publication PR would however argue that we are already inundated with too much information and this may be the only way of judging the value of the information as only the best would survive the test of time. Adopting such an approach would mean that manuscripts would be continually revaluated and updated. PR does not have to be a one-step process.

This study has a few limitations. It was a questionnaire-based survey of published authors, making it likely that our study population would be favourably disposed to PR. Weber et al[21] have previously shown that authors whose manuscripts are turned down are least satisfied with the quality of PR. Even though this study inadvertently excluded those worst affected by the current PR system, published authors are likely to represent the vast majority of authors. A second limitation is that this was a survey of authors of only two journals. We however believe that these authors represent a cross section of academicians who are likely to have experienced the PR process beyond just these two journals. Moreover, the PR process has a common theme, which can be examined across journals and specialties. We asked these authors to respond to our queries on the basis of their overall experience with the current system of PR and not that of a specific journal. Lastly, the response rate (14.4%) was relatively low for a questionnaire-based study, but PR is a relatively little discussed area of science and it would not be surprising if scientists had no opinion on it. It is also possible that a large number of emails went to the junk mail folders of authors, further accounting for the poor response rate. We cannot however think of any subgroup of authors who would have a strong opinion on the topic and still not want to participate.

Conclusion

This study presents the opinions of published authors on the current process of PR in biomedical publishing. The central theme that emerged from this study was that the current PR system is not perfect, but it is the best we have. Authors understand that PR per se provides only a minimal assurance of quality, and that the popular conception of PR as a stamp of authentication is far from the truth. We have discussed here the surrounding issues and alternative options.

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APPENDIX 1

QUESTIONNAIRE:

1. Do you think peer review in its current form is an adequate safeguard against research fraud?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

2. Do you think peer review helps improve manuscripts?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

3. Do you think reviewers have sufficient knowledge or insight into manuscripts to be able to judge them?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

4. Can peer review prevent fraudulent authors?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

5. Do you think peer review delays dissemination of research findings?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

6. Do you think reviewers give an honest opinion?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

7. Do you think editors of biomedical journals turn down many manuscripts without even asking for peer review?
☐ Yes ☐ No ☐ Not sure

8. Do you think editors act fairly in dealing with a manuscript in the face of contradictory peer review?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

9. Do you think peer review works effectively as a quality control mechanism in biomedical journals?
☐ Always ☐ Most of the time ☐ Sometimes ☐ Never

10. Do you think important research is lost and never published because of editorial and peer reviews?
☐ All the time ☐ Most of the time ☐ Sometimes/Rarely ☐ Never

11. In this Internet age with unlimited publishing capacity and high quality search engines, which can bring you only the articles you need, do you feel there is still a role for peer review as it exists today?
☐ Yes, strongly ☐ Yes, to some extent ☐ A little bit ☐ Not at all

12. Please type in any additional comments that you would like to make here. We would be delighted to have your opinion on this topic.

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